8.0 UPPER COLUMBIA RIVER SPRING CHINOOK ESU

8.1 POPULATIONS

8.1.1. Methow

8.1.1.1 Background

Given the greater number of chinook in the 1960s compared to the 1990s, and given the likelihood that population size was historically greater still than in the 1960s, the Methow should be considered as having a very high capacity for the potential to increase the population (see Table 8-1). This is based on redd surveys done in the 1960s, which found a range of 500-2000 spring chinook redds annually. The surveys were incomplete and likely undercounted the actual number of redds. A range of 0-1,000 redds was observed during comprehensive surveys in the 1990s. The larger population in the 1960s (for this analysis, populations were between 2,500 and 25,000) was likely to have been substantially smaller than historical populations given the fact that significant habitat alteration had occurred, and many of the mainstem dams had been constructed by that time.

Table 8-1. Upper Columbia River Spring Chinook (yearlings) Ecological Improvement Potential

		Data Sources						
		①	②		③	④	⑤	⑥	⑦
	3 Populations	Range of System Survival Rates GAP [D*]	Index of Potential to Increase Population: H/M/L (base period abundance/productivity estimate; recent abundance/productivity estimate or % Interim Target)	CSTN	Qualitative Assessment (CHART, NWFSC approach and other info) of Potential to Improve/Increase Habitat (H/M/L)	CSTN	Primary Candidate Anthropogenic Limiting Factors: **F**low, **C**hannel **M**orphology (bed, banks, sediment, LWD, sinuos., connectiv.), **T**emperature, **W**ater	CSTN	Ecological Improve-ment Potential	Improve-ment Potential Adjusted Based on Practical Constraints	Proposal to Fill Gap and Performance Measures/ Standards/ M&E
1 UCWEN	Wenatchee River		VH (700-3,000; 100-800)		M		M (CM, FP Connect, F)		M	M	
2 UCENT	Entiat River		VH (100-500; 50-150)		M		H (CM)		M	L	
3 UCMET	Methow River		VH (500 -2000; 0-1000)		M		M (F,SC, CM, Tr)		M	M	

*D = Delayed mortality due to transportation

CSTN = Council, States, TRTs, NWC

The Methow still supports of number of pristine to nearly pristine habitats, mostly within designated wilderness areas. A number of important production areas, however, have been and continue to be adversely affected by human activity. Irrigation water withdrawals substantially reduce habitat quality and quantity during base flow periods in the mainstem Methow, lower Chewuck, and lower Twisp rivers. A number of lesser tributaries are completely dewatered by irrigation withdrawals. Some of these tributaries, which do not support spring chinook spawning, are occupied by juvenile chinook in the spring. Some of the diversions on the mainstem and large tributaries consist of gravel "push-up" dams that can impede passage during low flows and

create locally unstable habitat conditions. Furthermore, maintaining these structures, accomplished by bulldozing additional alluvium from the riverbed, can destroy redds. Most of the irrigation withdrawals are screened to modern standards, but a few large diversions downstream of important production areas are inadequately screened. Several reaches of the mainstem and tributaries are listed under Section 303(d) of the Clean Water Act as impaired for various parameters, including temperature and instream flow. Most stream reaches downstream of wilderness areas lack sufficient instream flow. Large wood has historically been removed from stream channels following larger floods. Revetments have further limited channel complexity and off-channel habitat in the lower Lost, Chewuck, and Twisp rivers and at various locations on the mainstem. Riparian conditions have also been adversely affected by agricultural, silvicultural, residential, and recreational activities. Despite the significant amount of wilderness in the subbasin, it appears there is still medium potential to increase habitat capacity.

The anthropogenic limiting factors include substantial, irrigation-related reductions to base flow, particularly in drier years; loss of off-channel habitats; lack of large wood; passage barriers or impediments at irrigation diversions; inadequate screening at some irrigation diversions; and loss of riparian vegetation. Sedimentation may also be a problem in the lower Chewuck. The nearly annual dewatering of small streams that support spring chinook spring rearing may also be a significant limiting factor if the fish are unable to exit these systems before they dry up.

8.1.1.2 Suggested Mitigation Measures and Constraints

Improving irrigation water conveyance efficiencies, replacing archaic push-up dams, shifting irrigation points of diversion from smaller streams to the larger mainstem, late-season water leases, and replacing obsolete irrigation screens are all viable options for minimizing the effects of agriculture on fish habitat, and would provide almost immediate benefits. Reconnecting off-channel habitats would also provide benefits in the short and long term. Riparian conditions can be improved through planting, livestock fencing, and other proven techniques, although the benefits would not be fully realized until the trees matured. Selectively adding large wood could improve habitat productivity in some areas in the short and mid-terms, perhaps as a bridging technique until degraded riparian areas can be restored.

Social and political constraints limit the selection of techniques for restoring habitats in the Methow. The county government is opposed to further conversion of private lands to public ownership and is not inclined to further regulate private land use. Accordingly, riparian restoration or protection strategies on private lands will likely be limited to conservation easements or programs like CREP that keep lands in private ownership and on the tax rolls. Similarly, water purchases that decrease the agricultural base will meet local resistance. However, late-season water leases and on-farm efficiency projects are generally-supported strategies for improving stream flow. Lining canals to improve conveyance efficiency is opposed in some portions of the subbasin, either for fear that doing so would reduce groundwater recharge to the point where domestic wells would be affected, or over concerns about the loss of the aesthetic qualities of the existing canals. This technique is supported at least in the Chewuck and Beaver Creek watersheds. There is broad local support for replacing screens and improving fish passage at irrigation dams. Adding large wood will only be accepted in areas where possible channel migration would not result in loss of capital structures. The reconnection and restoration

of off-channel habitats would likely be supported within National Forest boundaries and at a few other sites where capital structures would not have to be relocated.

8.1.2. Entiat

8.1.2.1 Background

During the 1960s redd surveys in this system found a range of 100-500 spring chinook redds annually. The surveys were fairly complete given the limited distribution of spring chinook spawning in the Entiat, but they may have undercounted the actual number of redds. A range of 50-150 redds was observed during comprehensive surveys in the 1990s. The larger population in the 1960s was likely to have been substantially smaller than historical populations, because significant habitat alteration had occurred in the interim, including the construction of many of the mainstem dams. Given the greater number of chinook in the 1960s compared to the 1990s, and given the likelihood that population size was historically greater still than in the 1960s, the Entiat likely has a very high capacity to potentially increase population, even though it has never produced the numbers of fish that came from the Wenatchee and Methow rivers.

Spring chinook spawning is presently limited to approximately 10 miles of the mainstem Entiat and the lower reaches of the Mad River. Spring chinook may have historically spawned lower in the mainstem, but the channelization of the lower 14 miles of the river has rendered conditions there unsuitable for spawning. This channelization, with associated loss of off-channel habitat and riparian function, is the most significant habitat alteration in the watershed. The Entiat is less severely affected by water withdrawals, most of which are downstream of the spawning areas, but water withdrawals do limit habitat quality and quantity, particularly in drier years. It is believed that all of the irrigation diversions in the subbasin are screened to modern standards. Sedimentation from forest lands is also a significant factor. Steep terrain, highly erodible soils, forest road locations, and fire frequency combine to make sedimentation a much more significant problem in the Entiat than in the other subbasins occupied by UCR spring chinook The Entiat Valley is also growing in popularity as a retirement and vacation getaway. Some of the most desirable building locations are along the floodplain reaches, where spring chinook continue to spawn. Most of the spring chinook production areas are stream reaches bordered by private land.

The primary limiting factors result from channelization and levee construction, and include the loss of channel sinuosity and off-channel habitat, large woody debris, habitat complexity, and channel length. Channelization has also significantly increased stream gradient in the lower 14 miles of the mainstem. Sedimentation and the effects of water withdrawals to late-season base flows are also limiting factors.

8.1.2.2 Suggested Mitigation Measures and Constraints

Improving irrigation water conveyance and application efficiencies may help improve flows in the lower Entiat River and to some extent in the Mad River. Water purchases could also be used to improve instream flows during the summer and fall. Reconnecting off-channel habitat and breaching levees would provide the most significant benefits in the short and long term. Riparian conditions can be improved through breaching and modifying levee structure, although the

benefits would not be fully realized until the trees matured. Selectively adding large wood could improve habitat productivity in some areas in the short and mid-terms, perhaps as a bridging technique until degraded riparian areas can be restored. Rock weirs and other rock structures could be used to increase habitat diversity within the channelized section. Stabilizing upland sediment sources in the uplands would also improve habitat quality over time.

Social and political constraints limit the selection of techniques for restoring habitats in the Entiat. The county government is opposed to further conversion of private lands to public ownership and is not inclined to further regulate private land use. Accordingly, riparian restoration or protection strategies on private lands will likely be limited to conservation easements or programs such as CREP that keep lands in private ownership and on the tax rolls. However, within the channelized reach, riparian restoration will be significantly more complicated than simply planting and protecting trees. Levees would have to be breached or otherwise modified to support vegetation. This would leave homes and orchards at risk to channel migration and flooding, so is unlikely to enjoy broad local support. Similarly, water purchases that decrease the agricultural base will meet local resistance. Because most of the water in the basin is destined for perennial orchard crops, late-season water leases are not a viable option here. On-farm and conveyance efficiency projects are generally-supported strategies for improving stream flow, but such efforts are unlikely to substantially increase spring chinook production. A number of wood and rock habitat structures have been installed in recent years and are accepted by the local community as a desirable alternative to reconnecting the river to its floodplain. There are some opportunities to reconnect side channels in the lower reach.

The Action Agencies should aggressively pursue reconnecting side channels wherever technically and socially feasible. To the extent that additional structure placements are planned, existing structures should be closely monitored to determine whether or not they are achieving intended results. Land purchases in sensitive reaches where the floodplain is still intact should be pursued. The Action Agencies should explore opportunities to mitigate the fiscal impacts of additional public land purchases to local economies. Efforts to reduce sediment loading from upland sources should continue and be expanded, as practicable.

8.1.3. Wenatchee

8.1.3.1 Background

During the 1960s, redd surveys in this system found a range of 700-3,000 spring chinook redds annually. With the exception of those in the Little Wenatchee River, the surveys were incomplete and likely undercounted the actual number of redds. A range of 100-800 redds was observed during comprehensive surveys in the 1990s. The larger population in the 1960s was likely to have been substantially smaller than historical populations because significant habitat alteration had occurred in the interim, including the construction of many of the mainstem dams. Given the greater number of chinook in the 1960s compared to the 1990s, and given the likelihood that population size was historically greater still than in the 1960s, the Wenatchee is believed to have a very high capacity to potentially increase population.

Important spawning areas in the White, Little Wenatchee, and Chiwawa rivers remain in healthy, properly functioning condition. Another important spawning area, Nason Creek, has been significantly affected by highway and railroad construction, which substantially reduced side channel habitat connectivity and truncated the floodplain. Highway and railroad construction and, to a lesser extent, residential development have also substantially reduced floodplain connectivity, side channel habitat, and riparian quality along much of the mainstem Wenatchee River. While the most important spawning areas are in the previously listed tributaries, the mainstem Wenatchee is an important rearing and overwintering area. Irrigation impacts are minor in the major tributaries, but irrigation withdrawals in lesser tributaries such as Peshastin, Mission, and Chumstick creeks have precluded spring chinook from using these systems for many years. The lower mainstem Wenatchee is substantially affected by irrigation withdrawals in the late summer and early fall, particularly in drier years. The barrier at the Leavenworth National Fish Hatchery blocks access to nearly 20 miles of suitable spring chinook habitat. Riparian conditions in the major tributaries, except in Nason Creek, are generally excellent. The mainstem Wenatchee downstream from Leavenworth is largely devoid of structural wood.

The primary limiting factors are the loss of off-channel habitat in the mainstem and in Nason Creek, which adversely affects late-summer rearing and overwintering conditions; late-season flows in the lower Wenatchee mainstem; and the lack of large, in-channel wood. Flow and passage problems in Mission and Peshastin creeks prevent regular access. A barrier on the Icicle River prevents access to the upper river, but a recently formed fall several miles above the hatchery would likely prevent spring chinook access to most of the suitable habitat in that watershed.

8.1.3.2 Suggested Mitigation Measures and Constraints

Improving water efficiency, shifting irrigation points of diversion from smaller streams to the larger mainstem, and water rights purchases are all viable techniques for minimizing the effects of agriculture on fish habitat, and benefits would accrue almost immediately. Approximately 50 cfs is diverted from the Wenatchee River at Dryden and delivered to water users on the opposite side of the Columbia River. If this water could be seasonally pumped from the Columbia in drier years, base flows in the lower 13 miles of the mainstem Wenatchee would be substantially improved. Reconnecting off-channel habitats would also provide benefits in the short and long terms, particularly in the lower Wenatchee and in Nason Creek. Riparian conditions can be improved in the leveed portions of the watershed, although the benefits would not be fully realized until the trees mature. Selectively adding large wood could improve habitat productivity in some areas in the short and mid-terms, perhaps as a bridging technique until degraded riparian areas can be restored. Important, fully-functioning habitats, particularly in the White River, lower Nason Creek, and mainstem Wenatchee between Lake Wenatchee and Tumwater Canyon, are privately owned. As development of these properties would likely lead to further loss of riparian and floodplain function, acquisition or other forms of protection of these sensitive properties will be an important tool in ensuring the long-term fitness of UCR spring chinook.

In the Wenatchee, there is good local support for water conservation, and there may be support for shifting points of diversion. Late-season leases are likely to be unpopular, because the crops grown in the valley are mostly perennial. There are several compelling opportunities to reconnect

side channel habitats, and some of the work has already been done. Providing chinook passage at the Leavenworth hatchery is likely not a viable option because of Tribal concerns and because chinook may not be able to access the most productive habitats upstream. Fish passage and screening projects are generally well-supported. Improving riparian conditions on leveed portions of the river may be difficult, because of objections by the U.S. Army Corps of Engineers (Corps) to allowing vegetation on the levees.

The Action Agencies should actively pursue all viable side channel projects. The Corps should reconsider its levee vegetation management standards, because they appear to be based on information collected in the Mississippi Valley, where levee composition, vegetation type, and topography differ substantially from conditions in the Upper Columbia. Instream flow improvement in the lower Wenatchee and passage into Peshastin should also be pursued.

8.2 LITERATURE CITED

To be completed.